line 4, cancel the upper case "A" and substitute a lower case ----a----.

line 6, after "axis" change the period (.) to a comma (,).

line 6, after "axis," insert----whereby movement of said gears in intermeshing relationships creates the internal fluid pressure within said pump,----

line 7, cancel the upper case "S" and substitute a lower case ----s---.

line 9, after "cavity" change the period (.) to a comma (,).

line 10, cancel the upper case "S" and substitute a lower case ----s----.

CLAIM 2, line 1, cancel the lower case "a".

same line, change "cover" to ----covers---.

line 2, cancel "intended" and substitute ----adapted----.

line 3, after "cavity" insert ----containing fluid thereby----.

See REWRITE OF CLAIMS 1 and 2 at the end of this AMENDMENT.

Add the following new claims,

CLAIM 3

A1

A hydraulic gear pump adapted to be mounted in a cavity, said pump consisting of a gear housing; two covers, one on each side of the gear housing, coaxially mounted on a common longitude axis; a pair of gears in said gear housing, carried respectively by a drive shaft and an idler shaft, the latter being

drivingly connected to the gears and parallel to said longitudinal axis; and wherein the cover members on each side are hydraulically clamped to each side of the gear housing by the pressure generated by said pump and the liquid or fluid surrounding said pump in said surrounding cavity and being further characterized in that the outside pressurized axial area is larger than the inside axial area of the covers.

CLAIM 4

A pump, as claimed in CLAIM 3, wherein the gear housing is surrounded by liquid having a generated pressure by the rotation of said pump and thereby having the same pressure on the inside and the outside of the pump and whereby said assembly exhibits no radial stress.

CLAIM 5

The pump, as claimed in CLAIM 3, which include a pair of dowel pins for locating the gear housing in registry with the two covers and being located on the suction side of the gear housing and said drive shaft and said idler shaft being parallel to the longitudinal axis of said pump to thereby minimize gear housing deflection.

CLAIM 6

A pump as claimed in CLAIM 4, wherein the gears are bi- rotational and fluidly connected to a reciprocable hydraulic cylinder and having an interior piston and connected rod which extends, retracts and holds by reason of functionally located inlet check valve and outlet check valve and a pilot operated check valve serving to control the direction of movement of said fluid.

CLAIM 7

A pump as claimed in CLAIM 5, which includes a radial seal located approximately at the longitudinal center of said pump to divide said cavity into two separate chambers, one of which is fluidly connected to one side of a piston in the hydraulic cylinder and the other one is fluidly connected to the other side of the piston of said hydraulic cylinder.

CLAIM 8

An electro hydraulic linear actuator mechanism consisting of an electric bi-rotational motor, a bi-rotational hydraulic pump fluidly connected to a hydraulic cylinder inclusive of a oil reservoir concentrically positioned or located with

respect to and surrounding said hydraulic pump, said pump having no connection to the outside atmosphere, said assembly defining an interior volume having forty to sixty percent of said volume occupied by fluid and the rest air; all elements/components concentrically located upon a longitudinal axis.

CLAIM 9

An electro hydraulic linear actuator as claimed in CLAIM 8 wherein the bi-rotational hydraulic pump is located in the end cap of the hydraulic cylinder.

CLAIM 10

An electro hydraulic linear actuator as claimed in CLAIM 9 wherein the end cap and the rod end cap are connected by the same cylindrical structural member embracing all of the components thereof.

REMARKS

Reconsideration of the grounds of objection and rejection as set forth in the office Action of May 13, 2002 is respectfully requested both in view of the amendments to the SPECIFICATION and the CLAIMS and the follow Remarks.

The first objection was to the DRAWINGS, specifically FIG. 10. This objection is submitted to be met by the accompanying DRAWING of FIG. 10 showing a red ink correction, of the numeral "6a" to "7a".

The Examiner next objects to the CLAIMS as to certain punctuation informalities. The amendment of CLAIMS 1 and 2 meets the informality.

Next, CLAIMS 1 and 2 are rejected under 35 U.S.C. 112 first paragraph, on the ground that the subject matter is not sufficiently described as to enable one to make or use the invention. The rejection continues in a requirement as to an explanation as to the high pressure and low pressure affecting each of the valve and pistons and how the high pressure fluid affects the component parts.

Further CLAIM 1 as objected to with the language, "said outside pressurized axial area" and "inside pressurized area" on the ground of insufficient antecedent support.

CLAIM 2 is similarly objected to on the grounds of the limitation, "the end covers" likewise having insufficient antecedent support. These objections are controverted and believed met by reason of the following explanation in the

accompanying sketch identified as EXHIBIT A attached to the accompanying AMENDMENT A and REMARKS.

> [In addition to EXHIBIT A there is attached hereto an EXHIBIT B, which is a set of DRAWINGS covering FIGS. 1 through 18 and believed better numeraled with appropriate lead lines and also somewhat larger to aid in the review of the appropriate figures referred to in conjunction with the TABLES in the Application and the DESCRIPTION OF DRAWINGS.]

Lastly, as to the reference of valve 28 in FIG. 4 ---what holds valve 28 in its closed positioned?

A review of the SPECIFICATION is illuminative beginning at page 19, the first two paragraphs and especially the last sentence of the second paragraph stating, "Thus, as indicated above, the clockwise (cw) movement causes ball valve 23, 20 and 20a to open while ball valves 28, 18a, 21a are closed. It is urged with the understanding gained by this language that the FIG. 4, valve 28 shown in a closed position because the current was shut off to the electric motor, while the shaft was moving in a clockwise (cw) movement causing the pressure changes noted, which yields the ball 28 being in a closed position.

The schematic drawings of FIGS. 3 and 4, 5 and 6 can then be equated with FIG. 9 into the hardware for accomplishing the foregoing movement of the fluid.

FIG. 9 shows the electric motor at the left, then the gear pump and its other members and its other component parts to the right.

The Examiner's attention is also respectfully directed to page 12, in the middle, there is a bracketed language pointing out that in FIGS. 4, 5 and 6 the movement in the piston and the cylinder or actuator is opposite of that illustrated in FIG. 2.

For a further explanation of the pressure factor, the Examiner's attention is respectfully directed to the attached drawing (EXHIBIT A) entitled "Pressure Clamping of Bi-rotational Pump". In FIG. 1 we see the projection A-A, as a section of the pump shown in the bottom most figure. It shows the pump in a "cavity", which is the cylinder. FIG. 1 is the representative pressure inside the pump, around the gears, in other words, in the cavity containing the gears.

FIG. 2 shows the projected pressurized area from either end of the pump, exteriorly of the pump, but interiorly of the cavity. It is larger in all respects as show by the size of the black concentric area of FIG. 2 and the figure 8 area of

FIG. 1. FIG. 2 of course, will exert a clamping force holding the pump together axially while recognizing that there is an axial separating forces as illustrated by the black area in FIG. 1.

Note the comment on the lower left that the above shows the forces in a clockwise rotation of the pump whereas with a counterclockwise rotation the axial force changes direction from B-B to C-C. The result is a pump which is clamped together by its own generated pressure independent of the direction of the rotation of the pump.

Next, we come to the rejection of the CLAIMS upon various art, the Examiner citing on Section 102 and 103 and relying upon references as recited.

CLAIMS 1 and 2 are rejected under 102(b) with references cited.

With the understanding gained by the foregoing explanation of applicant's novel device, it is believed that it can be easily seen that neither Dworak or Lipscomb alone or in combination discloses applicant's device as claimed. Each of these pumps is really concerned with pressure balanced gear pumps; they are not pressure clamped, albeit Gordon uses this term.

These references employ a bearing block and differ from each other only in how the bearing block seal is designed. The blocks have an initial spring force holding the bearing block against the end faces of the gears with the pressure of the bearing block is independent of the pressure. The pressure balance pump will thus accommodate for wear on the faces of the bearing block and gear. This requires a much wider gear housing than the gear itself. The pumps generated pressure does not hold the pump together, rather it is bolted together as shown.

Furthermore, in present Applicant's invention, the end covers are clamped to the gear housing by the pressure that the pump generates. There are no bearing blocks which are pressure balanced. Applicant's design is much simpler to manufacture with less parts of high precision needed.

Additionally, Applicant's pump has no bolts to hold it together, instead it is mounted in a cavity, with the cavity lid holding the pump in the cavity, with the pressure the pump generates is holding the pump together.

It is thus urged that Applicant's invention as defined in the Amended CLAIMS and the new CLAIMS herewith distinguishes in structure and result from any of the references, Dworak or Lipscomb or Kalle or Martin or Kaempe.

Next, the Examiner relies upon Section 103 holding that the CLAIMS are unpatentable in view of Kalle in view of Martin et al. A examination of the Kalle reference reveals no end covers, but instead flaps are acting as partial end covers, but they do not support the drive shaft. This pump is not appropriate for bi-rotational applications as it will not be clamped in both directions of rotation. The Kalle pump is really a pressure balance pump, the pump generates pressure, it is true, but it does not hold the pump together. In fact, the flaps are attached with screws to the partial gear housing.

In Martin the partial gear housing and end cover is made out of one piece and this piece is pressure loaded to the opposite end cover. This pump of Martin's is not capable of bi-rotational applications because it is not be clamped in both directions of rotation. Martin's pump, if subject to reverse rotation, the pump will separate and fall apart.

Further, the Martin pump is further not meant to be mounted in a cavity. It is thus urged that the CLAIM as amended ands presented by Applicant herein would not be obvious to one having ordinary skill in the art to combine the structure of Kalle with the structure of Martin and his idler shaft.

It goes without saying that the suggestion must come from one of the references to combine the teachings of the two in order to make a valid combination with anticipation under Section 103.

It is urged that the Examiner's final sentence above his "CONCLUSION" over simplifies the matter. Applicant has exercised considerable ingenuity and inventiveness in designing his pump to be enclosed within a surrounding structure to create a cavity and which structure includes an array of check valves, interrupting a flow of fluid, or not interrupting the flow of fluid OR depending upon the rotation of the pump either clockwise or counterclockwise, such that the array of these component parts distributes the hydraulic fluid, to one side or the other of a piston arrangement thereby affecting reciprocating movement of a shaft dependent upon the operation of a simple switch.

While a case could probably be made that the pressure balanced gear pumps wherein the clearance of the gear faces in the end gear covers are built into the gear housing so that the clearance is fixed; would thereby yielding a somewhat more efficient pump. However, such pump would certainly be more complicated than Applicant's which is simpler with less parts of high precision. There are no bearing

blocks, nor are there bolts necessary; relying instead on the efficient, novel arrangement of component parts in a highly ingenious array of internal valves and conduit to direct the fluid in a manner as described above.

Applicant has made a sincere and bona fide effort to advance the prosecution of this Application by the evaluation of the art, the amendment of the CLAIMS, the addition of new CLAIMS and drawings/sketches to meet the objections of the Examiner.

Respectfully submitted,

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